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Report on the technical review of the seventh national communication of Hungary

Parties included in Annex I to the Convention were requested by decision 9/CP.16 to submit their seventh national communication to the secretariat by 1 January 2018. According to decision 15/CMP.1, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol are required to include in their national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. This report presents the results of the technical review of the seventh national communication and relevant supplementary information under the Kyoto Protocol of Hungary, conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" and the "Guidelines for review under Article 8 of the Kyoto Protocol".

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Abbreviations and acronyms

ADCS	Agrarian Damage Compensation System
AEA	annual emission allocation
Annex II Party	Party included in Annex II to the Convention
BR	biennial report
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
EEA	European Environment Agency
ERT	expert review team
ESD	effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
HMS	Hungarian Meteorological Service
HUF	Hungarian forint
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NCCS	National Climate Change Strategy
NE	not estimated
NF_3	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
non-ETS sectors	sectors not covered by the European Union Emissions Trading System
N_2O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
reporting guidelines for supplementary information	"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol, Part II: Reporting of supplementary information under Article 7, paragraph 2"
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	"UNFCCC biennial reporting guidelines for developed country Parties"

UNFCCC reporting guidelines on NCs	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications"
WAM	'with additional measures'
WEM	'with measures
WOM	'without measures'

I. Introduction and summary

A. Introduction

1. This is a report on the in-country technical review of the NC7 of Hungary. The review was coordinated by the secretariat in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention", particularly "Part V: UNFCCC guidelines for the technical review of national communications from Parties included in Annex I to the Convention" (annex to decision 13/CP.20), and the "Guidelines for review under Article 8 of the Kyoto Protocol" (annex to decision 22/CMP.1 and annex I to decision 4/CMP.11).[1]

2. In accordance with the same decisions, a draft version of this report was transmitted to the Government of Hungary, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

3. The review was conducted from 19 to 23 March 2018 in Budapest by the following team of nominated experts from the UNFCCC roster of experts: Mr. Amnat Chidthaisong (Thailand), Mr. Tom Dauwe (Belgium), Ms. Maria Ana Gonzalez Casartelli (Argentina) and Ms. Pascale Vizy (France). Mr. Chidthaisong and Mr. Dauwe were the lead reviewers. The review was coordinated by Mr. Bernd Hackmann (UNFCCC secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the NC7 of Hungary in accordance with the UNFCCC reporting guidelines on NCs (decision 4/CP.5) and the reporting guidelines for supplementary information, in particular the supplementary information required under Article 7, paragraph 2, and on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol (annex to decision 15/CMP.1 and annex III to decision 3/CMP.11).

1. Timeliness

5. The NC7 was submitted on 10 January 2018, after the deadline of 1 January 2018 mandated by decision 9/CP.16.

6. Hungary informed the secretariat on 8 January 2018 about its difficulties with making a timely submission. In accordance with decision 13/CP.20 and decision 22/CMP.1, a Party should inform the secretariat thereof by the due date of the submission, in order to facilitate the arrangement of the review process. The ERT noted with concern the delay in the submission and recommends that Hungary make its next submission on time.

2. Completeness, transparency of reporting and adherence to the reporting guidelines

7. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Hungary in its NC7, including the supplementary information under the Kyoto Protocol, mostly adheres to the UNFCCC reporting guidelines on NCs.

[1] At the time of the publication of this report, the Party had submitted its instrument of acceptance of the Doha Amendment; however, the amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the amendment.

Table 1
Assessment of completeness and transparency of mandatory information reported by Hungary in its seventh national communication, including supplementary information under the Kyoto Protocol

Section of NC	*Completeness*	*Transparency*	*Reference to description of recommendations*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to description of recommendations*
Executive summary	Complete	Transparent		National system	Complete	Transparent	
National circumstances	Complete	Transparent		National registry	Complete	Mostly transparent	Table 7
GHG inventory	Complete	Mostly transparent	Table 6	Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	
PaMs	Mostly complete	Partially transparent	Table 9	PaMs in accordance with Article 2	Mostly complete	Transparent	Table 9
Projections and the total effect of PaMs	Mostly complete	Mostly transparent	Tables 13 and 14	Domestic and regional programmes and/or arrangements and procedures	Complete	Transparent	
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent		Information under Article 10[a]	NA	NA	NA
Financial resources and transfer of technology[b]	NA	NA	NA	Financial resources[c]	NA	NA	NA
Research and systematic observation	Complete	Transparent		Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Mostly transparent	Table 9
Education, training and public awareness	Complete	Transparent					

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chapter III below.

[a] The assessment refers to information provided by the Party on the provisions contained in Article 4, paragraphs 3, 5 and 7, of the Convention reported under Article 10 of the Kyoto Protocol, which is relevant to Annex II Parties only. Assessment of the information provided by the Party on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

[b] Hungary is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention.

[c] Hungary is not an Annex II Party and is therefore not obliged to provide information on financial resources under Article 11 of the Kyoto Protocol, including on "new and additional" resources.

3. Summary of reviewed supplementary information under the Kyoto Protocol

8. The supplementary information under Article 7, paragraph 2, of the Kyoto Protocol is incorporated in different sections of the NC7, and the supplementary information under Article 7, paragraph 1, of the Kyoto Protocol is reported in the NIR of the 2017 annual submission. Table 2 provides references to where the information is reported. The technical assessment of the information reported under Article 7, paragraphs 1 and 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 2
Overview of supplementary information under the Kyoto Protocol reported by Hungary

Supplementary information	*Reference to section of the NC7*
National registry	3.4
National system	3.3
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	5.3
PaMs in accordance with Article 2	4
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	4.2
Information under Article 10	NA
Financial resources[a]	NA
Minimization of adverse impacts in accordance with Article 3, paragraph 14	Reported in the NIR of the Party's 2017 annual submission

[a] Reporting on financial resources under the Kyoto Protocol is relevant to Annex II Parties. As Hungary is not an Annex II Party, it does not have an obligation to provide information on financial resources under Article 11 of the Kyoto Protocol, including on "new and additional" resources.

II. Technical review of the information reported in the seventh national communication, including the supplementary information under the Kyoto Protocol

A. Information on national circumstances and greenhouse gas emissions and removals

1. National circumstances relevant to greenhouse gas emissions and removals

(a) Technical assessment of the reported information

9. The national circumstances of Hungary are outlined in the relevant section of its NC7. Hungary provided a concise and climate change oriented description of its national circumstances. It also outlined the relationship between its historic and future emission trends and the climate change policy agenda. There is a clear description of how the national circumstances define the factors that affect the development of climate policy and the implementation of the Convention and its Kyoto Protocol.

10. The NC7 contains key data on legislation, including information on Hungary's national low-carbon strategy, population trends (especially demographic developments), geography and land use, climate and climate change, economic developments, energy, transport, the buildings sector, industry (transition towards low-carbon industry), trade, the services sector, agriculture, forestry, resource efficiency and wastewater.

11. Between 1990 and 1992, Hungary experienced an in-depth and quick socioeconomic transition because of its transition to a market economy. This change caused an economic

recession in parts of Hungarian heavy industry, which in turn resulted in falling GHG emission levels.

14. The ERT noted that the economy grew (in terms of GDP) in Hungary between 1990 and 2015 by 37.7 per cent, while at the same time the Party's GHG emissions (excluding LULUCF) decreased by 34.9 per cent, and thus the ERT observed a decoupling of economic development from GHG emissions.

15. The ERT also noted that during the period 1990–2015 Hungary's population decreased by 5.1 per cent to 9.84 million inhabitants (mid-year population) while its GDP increased by 37.7 per cent. During the same period, GHG emissions per GDP unit and GHG emissions per capita decreased by 52.7 and 31.3 per cent, respectively. Table 3 illustrates the national circumstances of Hungary by providing some indicators relevant to emissions and removals.

Table 3
Indicators relevant to greenhouse gas emissions and removals for Hungary for the period 1990–2015

						Change (%)	
Indicator	*1990*	*2000*	*2010*	*2014*	*2015*	*1990–2015*	*2014–2015*
GDP per capita (thousands 2011 USD using purchasing power parity)	16.48	17.21	21.47	23.14	23.93	45.2	3.4
GHG emissions without LULUCF per capita (t CO_2 eq)	9.05	7.19	6.55	5.87	6.21	–31.3	5.8
GHG emissions without LULUCF per GDP unit (kg CO_2 eq per 2011 USD using purchasing power parity)	0.55	0.42	0.30	0.25	0.26	–52.7	2.4

Sources: (1) GHG emission data: Hungary's 2017 GHG inventory submission, version of 23 October 2017; (2) population and GDP: World Bank.

Note: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

16. Hungary requested flexibility in accordance with Article 4, paragraphs 6 and 10, of the Convention in relation to the base year definition. In accordance with Article 4, paragraph 6, of the Convention and decision 9/CP.2, Hungary, as a Party with an economy in transition, may use an average of its GHG emission totals for 1985–1987 as its base year.

(b) Assessment of adherence to the reporting guidelines

17. The ERT assessed the information reported in the NC7 of Hungary and identified an issue relating to transparency and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 4.

Table 4
Findings on national circumstances relevant to greenhouse gas emissions and removals from the review of the seventh national communication of Hungary

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 8 Issue type: transparency Assessment: encouragement	The ERT noted that the information describing the national circumstances and historic trends was not transparently provided. For example, Hungary did not provide information on temperature distribution, while annual temperature variations and precipitation were only qualitatively described but could have been quantitatively described. GDP per capita was not expressed in the domestic currency using purchasing power parity but instead expressed as a percentage of the EU average and compared with each year from 2008 to 2016 based on 2007. GDP by sector was only reported as a percentage of GDP for the share of the private sector. Regarding

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
		information on international trade patterns, only foreign investment in United States dollars was reported for 2016. During the review, Hungary provided additional information on its national circumstances and historic trends. The ERT encourages Hungary to improve the transparency of the reporting on its national circumstances and to improve the comparability of its NCs by providing the information listed in paragraph 8(a–m) of the UNFCCC reporting guidelines on NCs, which may be reported in tabular format.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

2. Information on greenhouse gas emissions and removals

(a) Technical assessment of the reported information

18. Total GHG emissions[2] excluding emissions and removals from LULUCF decreased by 34.9 per cent between 1990 and 2015, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 40.1 per cent over the same period. Table 5 illustrates the emission trends by sector and by gas for Hungary.

Table 5
Greenhouse gas emissions by sector and by gas for Hungary for the period 1990–2015

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2014*	*2015*	*1990–2015*	*2014–2015*	*1990*	*2015*
Sector									
1. Energy	68 197.29	54 663.46	48 876.20	40 905.57	43 274.77	–36.5	5.8	72.6	70.7
A1. Energy industries	20 687.29	23 656.05	17 888.19	13 497.20	13 906.95	–32.8	3.0	22.0	22.7
A2. Manufacturing industries and construction	13 622.83	4 651.73	3 404.85	4 059.08	4 325.55	–68.2	6.6	14.5	7.1
A3. Transport	8 878.17	9 083.63	11 663.05	11 186.55	12 202.64	37.4	9.1	9.5	19.9
A4. and A5. Other	22 363.26	15 767.71	14 782.86	11 299.16	12 065.28	–46.0	6.8	23.8	19.7
B. Fugitive emissions from fuels	2 645.74	1 504.34	1 137.26	863.58	774.35	–70.7	–10.3	2.8	1.3
C. CO_2 transport and storage	NO	NO	NO	NO	NO	–	–	–	–
2. IPPU	11 831.84	8 293.37	6 678.57	6 601.21	7 381.21	–37.6	11.8	12.6	12.1
3. Agriculture	9 975.64	6 100.63	5 642.44	6 493.90	6 676.35	–33.1	2.8	10.6	10.9
4. LULUCF	–2 671.60	–767.22	–4 551.87	–5 361.21	–6 512.11	143.8	21.5	NA	NA
5. Waste	3 891.12	4 369.59	4 276.51	3 936.59	3 838.62	–1.3	–2.5	4.1	6.3
6. Other	NO	NO	NO	NO	NO	–	–	–	–
Indirect CO_2	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	–	–	NA	NA
Gas[a]									
CO_2	73 447.85	58 544.69	52 217.01	44 034.38	46 777.50	–36.3	6.2	78.2	76.5

[2] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified. Values in this paragraph are calculated based on the 2017 annual submission, version of 23 October 2017.

	GHG emissions (kt CO_2 eq)					Change (%)		Share (%)	
	1990	2000	2010	2014	2015	1990–2015	2014–2015	1990	2015
CH_4	11 746.22	8 923.16	8 067.39	7 702.95	7 625.88	–35.1	–1.0	12.5	12.5
N_2O	8 315.21	5 367.24	3 808.79	4 224.18	4 308.75	–48.2	2.0	8.9	7.0
HFCs	NO	224.81	1 291.67	1 865.81	2 345.79	–	25.7	–	3.8
PFCs	375.72	283.11	1.52	1.45	1.15	–99.7	–20.9	0.4	0.0
SF_6	10.89	84.04	87.34	108.51	111.88	927.5	3.1	0.0	0.2
NF_3	NO	NO	NO	NO	NO	–	–	–	–
Total GHG emissions without LULUCF	**93 895.89**	**73 427.06**	**65 473.72**	**57 937.27**	**61 170.95**	**–34.9**	**5.6**	**100.0**	**100.0**
Total GHG emissions with LULUCF	**91 224.29**	**72 659.83**	**60 921.84**	**52 576.06**	**54 658.84**	**–40.1**	**4.0**	**NA**	**NA**

Source: GHG emission data: Hungary's 2017 annual submission, version of 23 October 2017.
[a] Emissions by gas without LULUCF and without indirect CO_2.

19. The decrease in total GHG emissions in Hungary was driven mainly by factors such as the economic downturn due to the transition to a more energy-efficient market economy and Hungary's implementation of climate-related PaMs (see chapter II.B below). The transition to a market economy resulted in the restructuring of industrial production and of the energy supply system, leading to a considerable decline in activity in the energy, heavy industry and agriculture sectors.

20. Hungary's transition to a market economy resulted in a sharp drop in emissions between 1985 and 1995, followed by a decade of economic growth and a relatively stable low level of emissions. Between 1990 and 2012, Hungary's GDP increased by 24.2 per cent, while GHG emissions decreased by 36.2 per cent. The global economic crisis of the late 2000s led to a slowdown in economic growth in 2009 and a decrease in total GHG emissions by 7.5 per cent from 2009 to 2012. Although Hungary was affected by the economic crisis in the eurozone in the late 2000s, its economy showed some signs of improvement starting in 2011, but this did not translate into an increase in emissions until 2013. In the period from 2013 to 2015, the economy showed a recovery of 7.3 per cent in GDP growth and this was linked to an increase in emissions in the same period of 6.4 per cent (excluding the LULUCF sector), which was mainly because of the economic reactivation of energy-intensive industries (steel and iron) and the increased fuel needs of the transport sector.

21. Between 1990 and 2015, GHG emissions from the energy sector decreased by 36.5 per cent (24,922.52 kt CO_2 eq), owing mainly to a reduction in energy consumption, a shift in the fuel mix reducing the use of coal and an increase in the share of renewables. GHG emissions from fuel combustion (transport sector) increased over the same period (by 37.4 per cent or 3,324.47 kt CO_2 eq). During the review, the Party provided additional information explaining that this increase was due to the increasing average age of the vehicle fleet and the need to improve the public transportation system.

22. Between 1990 and 2015, GHG emissions from IPPU decreased by 37.6 per cent (4,450.6 kt CO_2 eq), owing mainly to the economic downturn after the transition to a market economy, but also because of increased industrial efficiency and the shift of the economy towards services. Between 1990 and 2015, GHG emissions from the agriculture sector decreased by 33.1 per cent (3,299.3 kt CO_2 eq), owing mainly to the declines in agricultural production and livestock population. The LULUCF sector was a net sink of 6,512.1 kt CO_2 eq in Hungary in 2015. Net GHG removals have increased by 3,840.5 kt CO_2 eq since 1990, driven mainly by the increases in afforestation activities and the private ownership of land after the change in the regime. Between 1990 and 2015, GHG emissions from the waste sector decreased slightly, by 1.3 per cent (52.5 kt CO_2 eq).

23. The decrease in the total GHG emissions (excluding LULUCF) can be attributed mainly to CO_2 emissions, which decreased by 36.3 per cent between 1990 and 2015. Over

the same period, CH_4 emissions decreased by 35.1 per cent, while N_2O emissions decreased by 48.2 per cent. The combined F-gases (PFCs, HFCs and SF_6) increased by 536 per cent.

24. The ERT noted that the information provided in the NC7 regarding total GHG emissions was slightly inconsistent, because the total values reported in different sections differed by 0.12 per cent. During the review, the Party provided additional information explaining that the inconsistencies were due to having sourced values from different versions of the NIR: after the April 2017 submission of the NIR, Hungary submitted a revised version in October 2017.

(b) Assessment of adherence to the reporting guidelines

25. The ERT assessed the information reported in the NC7 of Hungary and identified issues relating to transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 6.

Table 6
Findings on greenhouse gas inventory information from the review of the seventh national communication of Hungary

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 10	The ERT noted that the information provided in the NC7 regarding total GHG emissions for 2015 was inconsistent, because the values reported in different sections differed by 0.12 per cent.
	Issue type: transparency	During the review, Hungary provided additional information explaining that the differences in the values of total GHG emissions were due to the revision in October 2017 of the 2017 NIR as a result of the review of the version submitted in April 2017, and that some of the reported values reflected the total GHG emissions before the revision and some after.
	Assessment: recommendation	The ERT recommends that Hungary improve the transparency of its reporting in future NCs by ensuring that the reporting of GHG emissions is consistent throughout the NC and with the latest annual submission available at the time of the preparation of the NC.
2	Reporting requirement specified in paragraph 12	The ERT noted that, although Hungary provided a description of the factors underlying emission trends, it did not describe the factors affecting the observed emissions in the period 2014–2015, when the emission trend changed from decreasing to increasing.
	Issue type: transparency	During the review, Hungary provided additional information explaining that the increase in emissions during the period 2014–2015 was driven mostly by the energy and industrial sectors. The increase in energy emissions was due to an increase in fuel use in the transport sector, and the increase in industrial emissions was due to the reactivation of emission-intensive industries, such as cement, iron and steel. Additional information was also provided clarifying that the major underlying driver for the increase in the LULUCF sector sink was private investment in afforestation projects after the transition to a market economy.
	Assessment: encouragement	In order to increase the transparency of the reporting, the ERT reiterates the encouragement made in the previous review report that Hungary provide in its next NC a description of the factors underlying the observed emission trends.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

3. National system for the estimation of anthropogenic emissions by sources and removals by sinks

(a) Technical assessment of the reported information

26. Hungary provided in the NC7 a description of how its national system for the estimation of anthropogenic emissions by sources and removals by sinks of all GHGs not

controlled by the Montreal Protocol is performing the general and specific functions defined in the annex to decision 19/CMP.1. The description includes most of the elements mandated by paragraph 30 of the annex to decision 15/CMP.1. The NC7 also contains a reference to the description of the national system provided in the NIR of the 2017 annual submission. The ERT took note of the review of the changes to the national system reflected in the report on the individual review of the 2017 annual submission of Hungary.

(b) Assessment of adherence to the reporting guidelines

27. The ERT assessed the information reported in the NC7 of Hungary and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

4. National registry

(a) Technical assessment of the reported information

28. In the NC7 Hungary provided information on how its national registry performs the functions in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and complies with the requirements of the technical standards for data exchange between registry systems. The ERT took note of the review of the changes to the national registry reflected in the report on the individual review of the 2017 annual submission of Hungary.

(b) Assessment of adherence to the reporting guidelines

29. The ERT assessed the information reported in the NC7 of Hungary and identified an issue relating to transparency. The finding is described in table 7.

Table 7
Findings on the national registry from the review of the seventh national communication of Hungary

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
1	Reporting requirement specified in paragraph 32 Issue type: transparency Assessment: recommendation	The NC7 does not provide a clear description of the procedures employed in the national registry to minimize discrepancies in the issuance, transfer, acquisition, cancellation and retirement of emission reduction units, certified emission reductions and temporary certified emission reductions. Further, the NC7 does not provide the results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of decision 19/CP.7 relating to the technical standards for data exchange between registry systems. During the review, Hungary provided additional information on these matters. The ERT recommends that Hungary improve the transparency of its reporting on how its national registry performs the functions and includes the elements listed in paragraph 32(e) and (j) of the UNFCCC reporting guidelines on NCs, which may be provided in tabular format.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information. The reporting on the requirements not included in this table is considered to be complete and transparent.

B. Information on policies and measures and institutional arrangements

1. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

(a) Technical assessment of the reported information

30. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Hungary committed to contributing to the joint EU effort to reduce GHG emissions by 20 per cent below the base-year level.

31. Implementation of the Kyoto Protocol by Hungary is underpinned by the Act on the Implementation of the UNFCCC and its Kyoto Protocol (2007), which also describes the rules for joint implementation projects in the territory of Hungary. The EU ETS and ESD policies were transposed into Hungarian legislation by the law on emissions trading. The overall responsibility for climate change policymaking lies with the Ministry of National Development, and a number of national institutions are involved in the implementation of the policy. The Climate Policy Department within the Ministry of National Development is responsible for international and EU-level climate negotiations and national climate lawmaking. It also includes the National Climate Protection Authority, which carries out tasks relating to the administration of F-gases and the EU ETS and is the administrator of the national registry.

32. Hungary has national legislative arrangements and administrative procedures in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources.

(b) Assessment of adherence to the reporting guidelines

33. The ERT assessed the information reported in the NC7 of Hungary and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

2. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

(a) Technical assessment of the reported information

34. Hungary provided information on its package of PaMs implemented, adopted and planned, by sector and partially by gas, in order to fulfil its commitments under the Convention and its Kyoto Protocol. Hungary reported on its policy context and legal and institutional arrangements put in place to implement its commitments and monitor and evaluate the effectiveness of its PaMs.

35. Hungary provided information on a set of PaMs similar to those previously reported in its NC6, with some exceptions. The ERT noted that a different structure and presentation was applied in the NC7 compared with the NC6, with less detailed descriptions of the PaMs and without reported impacts on emissions. Hungary provided information on changes made since the previous submission to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target. Hungary reported that no significant changes had been made since the previous NC in terms of the responsibilities and processes in climate policymaking.

36. Hungary gave priority to implementing the PaMs that make the most significant contribution to its emission reduction efforts. The ERT noted that it is difficult to understand how Hungary believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention, because information on the impact of PaMs on GHG emissions is missing. Hungary reported on how it periodically updates its PaMs to ensure that they reduce greater levels of emissions and also reported on the most important PaMs that have been discontinued since the previous submission.

37. Some PaMs are deferred to the local level. The most important is the Covenant of Mayors for Climate and Energy. Hungary clarified during the review that there are 56 signatories, four supporters and two coordinators under the Covenant of Mayors for Climate and Energy in Hungary, which covers 3,714,647 inhabitants. The ERT noted that the NCCS consists of the development of strategies at the regional level.

38. The key overarching related cross-sectoral policy in the EU is the 2020 climate and energy package, adopted in 2009, which includes the revised EU ETS and the ESD. The package is supplemented by renewable energy and energy efficiency legislation and

legislative proposals on the 2020 targets for CO_2 emissions from cars and vans, the carbon capture and storage directive, and the general programmes for environmental conservation, namely the 7th Environment Action Programme and the clean air policy package.

39. In operation since 2005, the EU ETS is a cap-and-trade system that covers all significant energy-intensive installations (mainly large point emissions sources such as power plants and industrial facilities) that produce 40–45 per cent of the GHG emissions of the EU. It is expected that the EU ETS will guarantee that the 2020 target (a 21 per cent emission reduction below the 2005 level) will be achieved for sectors under the scheme. The third phase of the EU ETS started in 2013 and the system now includes aircraft operations (since 2012) as well as N_2O emissions from chemical industries, PFC emissions from aluminium production and CO_2 emissions from industrial processes (since 2013).

40. The ESD became operational in 2013 and covers sectors outside the EU ETS, including transport (excluding domestic and international aviation, and international maritime transport), residential and commercial buildings, agriculture and waste, together accounting for 55–60 per cent of the GHG emissions of the EU. The aim of the ESD is to decrease GHG emissions in the EU by 10 per cent below the 2005 level by 2020 and it includes binding annual targets for each member State for 2013–2020.

41. Hungary highlighted the EU-wide mitigation actions that are under development, such as the proposals, as part of the new 2030 energy and climate policy framework of the EU, for the revision of the EU directives on energy efficiency, renewable energy and the energy performance of buildings.

42. Hungary introduced national-level policies to achieve its targets under the ESD and domestic emission reduction targets. The ERT noted that the information necessary for assessing the mitigation effects of PaMs was not reported by Hungary for the majority of its PaMs. Table 8 provides a summary of the reported information on the PaMs of Hungary.

43. Hungary reported that it is on track to attain its 2020 emission reduction target. In addition to the PaMs already implemented, a number of other mitigation actions will provide a stronger foundation for achieving Hungary's 2020 emission reduction target, such as the adopted new requirements on the energy performance of buildings (entering into force in 2018) and the planned promotion of eco-driving techniques.

Table 8
Summary of information on policies and measures reported by Hungary

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Second NCCS	NE
	National Energy Strategy	NE
	Operational Programmes under the European Cohesion Fund	NE
	EU climate and energy package	NE
Energy		
Energy supply	Capacity maintenance of the Paks nuclear power plant	NE
Transport	Improvement of the bicycle transportation network	1 550
	National Transport Infrastructure Development Strategy	NE
	Application of usage-based road toll on heavy-duty vehicles	136.6
	Anyos Jedlik Plan for the promotion of e-mobility	NE
Renewable energy	Operational grant for the production of renewable energy	NE

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*
Energy efficiency	National Energy Efficiency Action Plan	NE
	National Building Energy Performance Strategy	NE
	Funding for the energy modernization of residential buildings – Warmth of Home programme	NE
	Funding for the energy modernization of residential buildings – interest-free loan programme	NE
	Tax advantage for companies after energy efficiency investments	NE
IPPU	EU F-gas regulation	NE
Agriculture	Greening payment	NE
	Protection against soil erosion	NE
LULUCF	Rural Development Programme	NE
	National Forest Programme	NE
Waste	Waste Law	NE
	National Waste Management Plan	NE
	Environmental product fee	NE

Note: The estimates of mitigation impact are estimates of emissions of CO_2 or CO_2 eq avoided in a given year as a result of the implementation of mitigation actions.

44. In addition, Hungary reported on its second NCCS, which outlines its long-term decarbonization road map beyond 2020. During the review, Hungary provided detailed information on the strategy and its three main components: the decarbonization road map; the National Adaptation Strategy; and awareness-raising activities. The objective of the decarbonization road map is to launch a planning mechanism that contributes to the development of the Hungarian green economy and the sharing of international decarbonization burdens on the basis of balanced respect for competitiveness, welfare, the technological shift and climate protection. The strategy is operationalized via the Climate Change Action Plan 2018–2020. Its main role is to transpose into practice the climate change development concepts included in the second NCCS.

45. Funding of climate action is partly achieved via the EU structural funds and Hungary's operational programmes. Hungary reported that improving energy efficiency and increasing renewable energy, among other things, are achieved via its operational programmes, which include the Environment and Energy Efficiency Operational Programme, the Economic Development and Innovation Operational Programme and the Integrated Transport Development Operational Programme. Additionally, resources from income generated from the sale of emission allowances under the EU ETS are invested in mitigation measures via the Economy Greening Scheme and the Green Economy Financing Scheme.

46. The ERT noted that Hungary did not report on the impacts of most of its PaMs. For the PaMs for which an impact was reported, the ERT also noted that providing information on methodologies, assumptions and data would enhance the transparency of the reporting.

(b) Policies and measures in the energy sector

47. Between 1990 and 2015, GHG emissions from the energy sector decreased by 36.5 per cent or 24,922.52 kt CO_2 eq, owing to the economic decline in the period 1990–1995, leading to the closure of many industrial installations. Since 1995, Hungary has been able to decouple economic growth from GHG emissions, enabling it to maintain its decreasing emission trend in the energy sector by decreasing energy consumption (–12.4 per cent

between 1990 and 2015), decreasing coal consumption (–62.2 per cent between 1990 and 2015) and increasing the share of non-GHG emitting technologies (69.3 per cent between 1990 and 2015), such as renewable and nuclear energy.

48. **Energy supply**. The National Energy Strategy is the main long-term strategy of Hungary in the energy sector. The main objective of the National Energy Strategy is to decrease energy dependency, which is a key policy priority for Hungary considering its dependence on the import of fossil fuels and electricity. To reduce dependency on imported fossil fuels and electricity, Hungary aims to increase the share of both nuclear and renewable energy production, increase energy efficiency, construct cross-border connections to enhance the import and export of electricity and implement a renewal of the energy institutional framework.

49. The replacement of the existing 2,000 MW Paks nuclear power plant by two new installations of 1,200 MW each, expected to be in operation from 2026 and 2027 onwards, is an important policy to assure sufficient domestic and non-GHG emitting electricity production. This is projected to contribute to a reduction in the emission intensity of electricity production from 370 g CO_2/kWh in 2012 to 200 g CO_2/kWh by 2030.

50. **Renewable energy sources**. Renewable energy targets were set for individual EU member States for 2020 in the electricity, heating and cooling and transport sectors. Hungary's target is a 13 per cent share of renewables in gross final energy consumption. The Hungarian Government increased this to 14.6 per cent by 2020 and Hungary is on track to achieving this target because it already achieved a share of 14.6 per cent in 2016. This was achieved via increased renewable energy use in the transport, electricity, and heating and cooling sectors, the latter achieved via the modernization of community district heating and private heat generation. By 2030, the share of generation of heat from renewable energy sources is planned to have increased to 25 per cent from 10 per cent in 2012.

51. In line with the National Energy Strategy, Hungary plans to further increase the share of renewable energy (in total primary energy consumption) to 20 per cent by 2030. This will mainly be driven by the increased use of renewable energy sources for heating and cooling for district heating and the promotion of renewable energy sources of electricity, the latter with an emphasis on solar photovoltaics. The main instrument used to increase renewable energy use in Hungary is the operational grant for the production of renewable energy. Additionally, resources from the income generated from the sale of emission allowances under the EU ETS are invested in mitigation measures.

52. **Energy efficiency**. Hungary's energy efficiency policies are guided by several EU regulations and directives, including the EU directive on energy efficiency and the recast of the EU directive on the energy performance of buildings. In order to achieve the objectives, Hungary prepared the National Energy Efficiency Action Plan for 2020 and the National Strategy for the Energy Performance of Buildings (2015). The latter includes measures to achieve the quantified objective of the EU directive on energy efficiency, that is to decrease primary energy consumption by 10 per cent by 2020 compared with the 2005 level. For Hungary, that objective translates into a reduction of 1,009 PJ primary energy consumption.

53. **Residential and commercial sectors**. Energy efficiency improvements and increasing renewable energy uptake in the residential and commercial sector are laid down in several Hungarian strategies and plans, most notably the National Energy Efficiency Action Plan, which includes the National Building Performance Strategy, and the District Heating Development Action Plan. Energy efficiency and renewable energy use in the residential sector are supported by several operational programmes. Funding for the energy modernization of residential buildings – Warmth of Home programme has been implemented since 2008. The majority of the domestic resources available for improving the energy efficiency of residential buildings came from the revenues from sales of units under the Kyoto Protocol (2008–2013) and EU ETS emission allowances.

54. **Transport sector**. The transport sector is the only sector in Hungary that showed an increasing emission trend between 1990 and 2015. Transport emissions grew by 3,324.47 kt CO_2 eq or 37 per cent between 1990 and 2015. Hungary has implemented a number of PaMs to curb the emission trend in the transport sector, including increasing the share of biofuels, which is part of Hungary's target under the EU directive on renewable energy. Modal shift

has been promoted through the introduction of a road toll for heavy-duty vehicles, improvements to the public transport service and improvements to the bicycle transportation network. Hungary implemented an extensive policy package to support alternative-fuelled vehicles, compressed natural gas/liquefied natural gas, biofuels, hydrogen and, especially, electricity. Introduction of electric vehicles in Hungary is supported by the Anyos Jedlik Plan.

55. The ERT noted that the NC7 does not include information on how Hungary promotes and implements the decisions of ICAO and IMO to limit emissions from aviation and marine bunker fuels. During the review, Hungary clarified that most of the emissions from aviation are included under the EU ETS. Additionally, Hungary clarified that it is promoting ambitious action under ICAO and its Carbon Offsetting and Reduction Scheme for International Aviation, in line with the EU position.

56. **Industrial sector**. Hungarian installations have been part of the EU ETS since 2005. The EU ETS is the key instrument driving large energy consumers in the economy to reduce their fossil fuel consumption and GHG emissions. The Irinyi Plan provides a strategy for strengthening the share of industry in the Hungarian GDP taking into account resource and energy efficiency.

(c) Policies and measures in other sectors

57. **Industrial processes**. Emissions from industrial processes accounted for 12.1 per cent of total GHG emissions (without LULUCF) in Hungary in 2015. Emissions had decreased by 38 per cent by 2015 compared with the 1990 level. Hungary did not report specific national PaMs that affect emissions from industrial processes. During the review, the Party clarified that the main national PaMs affecting emissions in this sector are EU policies, directly applicable or transposed into national law, including the EU F-gas regulation, the EU directive on mobile air conditioning and the EU directive on industrial emissions. Additionally, some of the emissions from industrial processes are included under the EU ETS.

58. **Agriculture**. Between 1990 and 2015, GHG emissions from the agriculture sector decreased by 33 per cent (3,299.29 kt CO_2 eq), owing mainly to the transition to a market economy and reductions in agricultural production, livestock population and the use of fertilizers. Since Hungary's accession to the EU, its agriculture has developed considerably and in terms of its efficiency, competitiveness and profitability has begun to catch up with that of the EU-15.[3]

59. Since the Party's NC6, the Hungarian Rural Development Strategic Plan has expired. Actions to reduce GHG emissions in the agriculture sector are funded by EU funds such as the European Agricultural Guarantee Fund and the Rural Development Programme. In its NC7 Hungary reported a number of PaMs to protect against soil erosion, protect water against nitrate pollution, increase crop diversification and maintain existing grassland, and improve manure management.

60. **LULUCF**. The LULUCF sector in Hungary was a net sink of 6,512.11 kt CO_2 eq in 2015, mainly achieved by increasing forest cover and increasing stock volume by 121 million m^3 between 1981 and 2015. The forestry sector is regulated by the Act on Forests, Forest Protection and Forest Management, which covers, among other things, forest protection, afforestation, sustainable forest management and enforcement.

61. The main long-term policy in the forestry sector is the National Forestry Strategy (2016–2030), a continuation of the first National Forest Programme (2006–2015). The National Forestry Strategy aims to increase forest cover in Hungary to 27 per cent by 2050. During the review, Hungary explained that climatic changes will have an important adverse effect on the forestry sector in the longer term, which poses additional challenges to implementing, and is taken into account in, the National Forestry Strategy. The measures in

[3] The 15 member States that formed the European Community at the time of the ratification of the Kyoto Protocol (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom of Great Britain and Northern Ireland).

the National Forest Strategy are partly funded by the Rural Development Programme for the period 2014–2020.

62. **Waste management**. Emissions in the Hungarian waste sector mostly originate from landfill sites and for several years after 1990 the emissions were increasing. However, in 2003 emissions from the waste sector started to decrease and in 2015 they were at a level very similar to the 1990 emission level. Emissions in 2015 were 1 per cent or 52.50 kt CO_2 eq lower than in 1990.

63. The main PaMs in the waste sector of Hungary are a landfill tax and selective waste collection (introduced by the Waste Law), the National Waste Management Plan and the National Waste Management Public Services Plan. Hungary also reported PaMs aimed at improving wastewater management, such as the National Implementation Programme on Wastewater Collection and Treatment and the Sewage Sludge Treatment and Recovery Programme.

(d) Minimization of adverse impacts in accordance with Article 2 of the Kyoto Protocol

64. In the NC7 Hungary reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts on other Parties, especially developing country Parties. Hungary is guided by the principle that national reduction targets shall be achieved by national climate policies avoiding adverse impacts on developing countries, such as carbon leakage. The Party's main instrument is the integration of climate policy into development policy, which is guaranteed via the second NCCS. The ERT noted that this information was included in the BR3, which was submitted as an annex to the NC7. During the review, Hungary provided additional details on how the adverse effects of PaMs on other Parties and on international trade are minimized, including the impact assessments that Hungary and the EU perform before the implementation of new policies.

65. Further information on how Hungary strives to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties was reported in the Party's 2017 annual submission. The reporting included information on cooperation on the development of technologies. The ERT noted that the reported information has not changed significantly since the NC6 and the 2014 NIR. The additional information provided during the review enhanced transparency.

66. Although Hungary does not take part in large-scale development projects relating to climate change alone, as an EU member State it fully supports the EU's activities in that regard. Hungary's approach to minimizing adverse impacts consists mainly of adherence to EU policies, such as those aimed at avoiding adverse impacts, fostering sustainable development and improving international trade.

(e) Assessment of adherence to the reporting guidelines

67. The ERT assessed the information reported in the NC7 of Hungary and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 9.

Table 9

Findings on policies and measures, including those in accordance with Article 2 of the Kyoto Protocol, from the review of the seventh national communication of Hungary

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 5	The ERT noted that information on PaMs (i.e. on energy, renewable energy, industry) was reported in the chapter of the NC7 on national circumstances.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: transparency	During the review, the Party clarified that the information in the chapter on national circumstances is also relevant in the context of the chapter on PaMs.
	Assessment: recommendation	The ERT recommends that in its next NC Hungary integrate the information provided in the chapter on national circumstances into the chapter on PaMs in order to provide a transparent overview of all PaMs.
2	Reporting requirement[a] specified in paragraph 13	The ERT noted that Hungary did not report national PaMs in the industrial processes sector, in particular PaMs addressing F-gas emissions.
	Issue type: completeness	During the review, Hungary provided information explaining that the EU directive on mobile air conditioning and the EU F-gas regulation, and the transposition of the legislation into Hungarian law, affect F-gas emissions.
	Assessment: recommendation	The ERT recommends that the Party communicate information on all PaMs, including for the industrial processes sector, adopted to implement commitments under Article 4, paragraph 2(a) and (b), of the Kyoto Protocol.
3	Reporting requirement[a] specified in paragraph 17	The ERT noted that the description of PaMs in the NC is organized by sector but not subdivided by gas.
	Issue type: completeness	In order to enhance transparency, the ERT recommends that Hungary organize the reporting of PaMs by sector in its next NC.
	Assessment: recommendation	
4	Reporting requirement[a] specified in paragraph 23	The ERT noted that Hungary did not report estimates of the mitigation impact of most of its PaMs, except for a number of PaMs in the transport sector.
	Issue type: completeness	During the review, in response to an ERT request, Hungary explained that the mitigation impact of most of its PAMs has not been estimated as there is no unified monitoring system in Hungary. It further explained that this is likely to be done in the future.
	Assessment: encouragement	The ERT encourages Hungary to report in its next NC, to the extent possible, mitigation impacts for individual or grouped PaMs or explain why this may not be possible due to its national circumstances. The ERT also encourages Hungary to report in its next NC a description of estimation methods.
5	Reporting requirement[a] specified in paragraph 24	The ERT noted that information about the costs and non-GHG mitigation benefits of PaMs and how they interact with other PaMs at the national level was missing from the NC7.
	Issue type: completeness	During the review, Hungary provided additional information on some of its PaMs that are innovative and may be effectively replicated by other Parties, including Hungary's support system for electricity production from renewable energy sources, which includes a new penalty system applicable to small installations (below 0.5 MW) introduced in January 2017.
	Assessment: encouragement	In order to increase transparency, the ERT encourages Hungary to include this information in its next NC
6	Reporting requirement[b] specified in paragraph 35	The ERT noted that Hungary did not report information on the steps it has taken to promote and/or implement any decisions by ICAO and IMO to limit or reduce emissions of GHGs not controlled by the Montreal Protocol from aviation and marine bunker fuels.
	Issue type: completeness	During the review, Hungary provided additional information clarifying that it implements ICAO and IMO decisions, in line with the EU position.
	Assessment: recommendation	In order to enhance completeness, the ERT recommends that Hungary include this information in its next NC.
7	Reporting requirement[b] specified in paragraph 36	The ERT noted that rather general and not very detailed information was reported in the BR3, which was submitted as an annex to the NC7, on how Hungary strives to implement PaMs in such a way as to minimize adverse effects, including the adverse

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: transparency Assessment: recommendation	effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties. For example, it is not clear how NCCS will guarantee that climate policy is integrated into development policy. Hungary also mentioned that "a specific policy framework has been put into practice", without going into further detail. During the review, Hungary provided additional details on how the adverse effects of PaMs on other Parties and on international trade are minimized, including the impact assessments that Hungary and the EU perform before the implementation of new policies. In order to enhance transparency, the ERT recommends that Hungary provide in its next NC transparent information on how it strives to implement PaMs in such a way as to minimize adverse effects by explaining how NCCS, which appears pivotal in this respect, will be implemented.

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

[a] Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

[b] Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information.

C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

1. Projections overview, methodology and results

(a) Technical assessment of the reported information

68. Hungary reported updated projections for 2020 and 2030 relative to actual inventory data for 2015 under the WEM and WAM scenarios.

69. The ERT noted inconsistencies between the values of "total emissions, including LULUCF", "total CO_2 emissions, excluding LULUCF" and "CH_4 emissions, excluding LULUCF" reported in the NC7 in table 5.2 (WEM scenario) and in table 5.3 (WAM scenario) for 2015, even though the values are based on actual inventory data. The ERT also noted that the projections reported in the NC7 are not consistent with the projections reported in CTF tables 6(a) and 6(b).

70. The ERT further noted inconsistencies in the values reported and in some calculations in the projections tables of the NC7 (tables 5.2 and 5.3), as well as between the values reported for each sector and the total values. Further, the ERT noted inconsistencies between the projections reported in the NC7 (tables 5.2 and 5.3) and those reported in CTF tables 6(a) and 6(c). Finally, the ERT noted that for the energy sector the WAM scenario showed higher emission levels than the WEM scenario. During the review, Hungary provided an updated version of its projections, which addressed all of these issues. The updated version of the projections provided by Hungary during the review was used by the ERT as the basis for the projections presented in this report.

71. Hungary provided a definition of its scenarios in the NC7, explaining that its WEM scenario includes implemented and adopted PaMs, while its WAM scenario also includes planned measures. For the projections, the NC7 mentioned that the status of the extent to which policies are considered as implemented or planned was described in BR CTF table 3.

72. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) for the period 2015–2035. The NC7 did not include projections relative to actual inventory data for 1990–2030, but they were included in CTF tables 6(a) and 6(c) of the BR3, which is annexed to the

NC7. The projections are also provided in an aggregated format for each sector as well as for a Party total using global warming potential values from the IPCC Fourth Assessment Report.

73. Hungary did not report emission projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides.

74. Emission projections related to aircraft engaged in international transport were reported separately and were not included in the totals, which was noted by the ERT as an improvement with respect to previous NCs.

75. Hungary reported on factors and activities affecting emission projections for some sectors; however, the ERT noted that Hungary could further substantiate the factors and activities affecting the LULUCF and waste sectors by including the reasons behind the expected changes reported for each subsector.

(b) Methodology, assumptions and changes since the previous submission

76. The methodologies used for the preparation of the projections are different from those used for the preparation of the projections for the NC6. The changes reported relate to the use of the latest NIR; the timescale of the projections being extended to 2035; the European electricity market model being applied for the projections of electricity generation; and the IPCC model being used to project emissions from the waste sector.

77. The ERT noted that Hungary did not report information on key underlying assumptions or values of variables such as GDP growth and population growth using table 2 of the UNFCCC reporting guidelines on NCs. Hungary did however report the key underlying assumptions in CTF table 5 of the BR3, which is annexed to its NC7. As per CTF table 5 of the BR3, Hungary relied on the following key underlying assumptions: GDP is expected to increase by 3.7 per cent by 2020, by 2.8 per cent by 2025 and by 2.6 per cent by 2030; and Hungary's population is expected to decrease from 9,855,571 inhabitants in 2015 to 9,047,175 inhabitants in 2030.

78. Hungary reported that the projections were not calculated using one comprehensive model; instead, different methods were used for each sector, including logarithmic extrapolations, multivariable regression models and linear regression models. The ERT noted that the CASMOFOR model applied for afforestation was developed by Hungarian experts and is an internationally recognized model compatible with IPCC guidelines.

79. Hungary provided some information on the assumptions, methodologies, models and approaches used in the projections analysis. The ERT noted that further information could be reported regarding the strengths and weaknesses of the models or approaches used and an explanation of how the models or approaches used account for any overlap or synergies that may exist between different PaMs, as required by the UNFCCC reporting guidelines on NCs.

80. The ERT noted that Hungary provided a sensitivity analysis for the agriculture and waste sectors following an encouragement made by the previous ERT.

81. Sensitivity analyses were not conducted for cross-sectoral variables; instead Hungary applied a 1 per cent variation only to specific variables for the waste and agriculture sectors. During the review, Hungary provided additional information explaining that it did not use cross-sectoral variables in its sensitivity analysis because the projections were not performed on the basis of those parameters. According to the sensitivity analysis, the agriculture sector shows a 0.3 per cent change in GHG emissions in 2020 due to a 1 per cent increase in cattle population.

(c) Results of projections

82. The projected emission levels under different scenarios and information on the Kyoto Protocol targets and the quantified economy-wide emission reduction target are presented in table 10 and the figure below.

Table 10
Summary of greenhouse gas emission projections for Hungary

	GHG emissions (kt CO_2 eq per year)	*Changes in relation to base-year[a] level (%)*	*Changes in relation to 1990 level (%)*
Kyoto Protocol base year[b]	109 574.82	NA	–14.3
Quantified emission limitation or reduction commitment under the Kyoto Protocol (2013–2020)[c]	51 761.44	NA	NA
Quantified economy-wide emission reduction target under the Convention[d]	NA	NA	NA
Inventory data 1990[e]	93 895.89	–14.3	NA
Inventory data 2015[e]	61 107.95	–44.2	–34.9
WEM projections for 2020[f]	58 897.5	–46.3	–37.3
WAM projections for 2020[f]	58 807.8	–46.3	–37.4
WEM projections for 2030[f]	60 375.3	–44.9	–35.7
WAM projections for 2030[f]	59 842.1	–45.4	–36.3

Note: Updated projections were provided by the Party during the review; the projections are for GHG emissions without LULUCF.

[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] The Kyoto Protocol base-year level of emissions is provided in the initial review report, contained in document FCCC/IRR/2016/HUN.

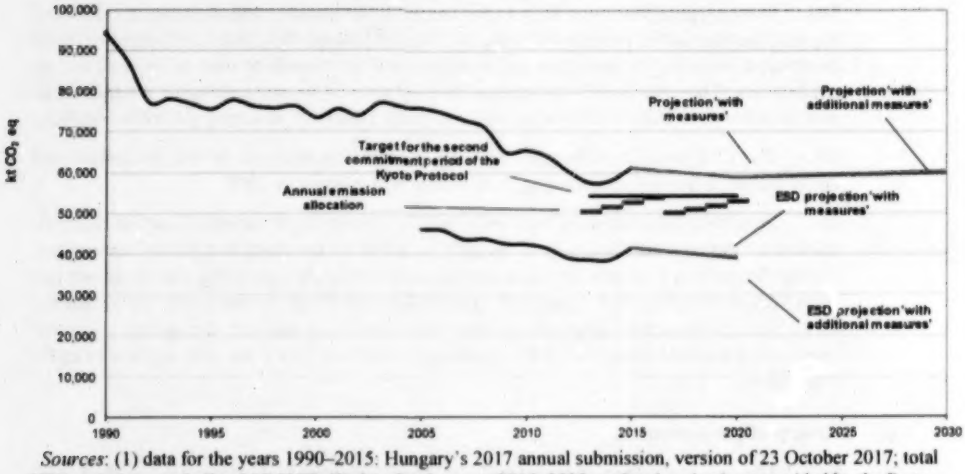
[c] The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target of the EU and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. The target for non-ETS sectors is 10 per cent above the 2005 level under the ESD.

[d] The quantified economy-wide emission reduction target under the Convention is a joint target of the EU and its 28 member States. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020.

[e] From Hungary's 2017 GHG inventory submission.

[f] Updated projections were provided by the Party during the review.

Greenhouse gas emission projections reported by Hungary



Sources: (1) data for the years 1990–2015: Hungary's 2017 annual submission, version of 23 October 2017; total GHG emissions excluding LULUCF; (2) data for the years 2015–2030: updated projections provided by the Party during the review; (3) ESD data: EEA, 2017.

83. Hungary's total GHG emissions excluding LULUCF in 2020 and 2030 are projected to be 58,897.5 and 60,375.3 kt CO_2 eq, respectively, under the WEM scenario, which represents a decrease of 37.3 and 35.7 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030 are projected to be lower than those in 1990 by

37.4 and 36.3 per cent and amount to around 58,807.8 and 59,842.1 kt CO_2 eq, respectively. The 2020 projections suggest that Hungary will continue contributing to the achievement of the EU target under the Convention (see para. 44 above).

84. Hungary's target for non-ETS sectors is to limit its emission growth to 10 per cent above the 2005 level by 2020 (see para. 41 above). Hungary's AEAs, which correspond to its national emission target for non-ETS sectors, change from 50,398.98 kt CO_2 eq in 2013 to 52,830.57 kt CO_2 eq in 2020. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 39.1 Mt CO_2 eq by 2020. Under the WAM scenario, Hungary's emissions from non-ETS sectors in 2020 are projected to be 39.0 Mt CO_2 eq (EEA, 2017). The projected level of emissions under the WEM and WAM scenarios is 25.9 and 26.1 per cent, respectively, below the AEAs for 2020. The ERT noted that this suggests that Hungary expects to meet its target under the WEM and WAM scenarios (see para. 44 above). Hungary presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in table 11.

Table 11
Summary of greenhouse gas emission projections for Hungary presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
	1990	*2020*		*2030*		*1990–2020*		*1990–2030*	
Sector		*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	59 319	28 858	28 858	27 243	27 274	–51.4	–51.4	–54.0	–54.0
Transport	8 878	11 730	11 712	14 877	14 654	32.1	31.9	67.6	65.0
Industry/industrial processes	11 832	6 923	6 923	7 095	7 095	–41.5	–41.5	–40.0	–40.0
Agriculture	9 976	7 362	7 362	7 892	7 892	–26.2	–26.2	–20.9	–20.9
LULUCF	–2 672	–3 385	–4 239	–3 156	–3 772	26.7	58.7	18.1	41.2
Waste	3 891	4 027	3 953	3 269	2 928	3.5	1.6	–16.0	–24.8
Other (specify)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total GHG emissions without LULUCF	**93 896**	**58 898**	**58 808**	**60 375**	**59 842**	**–37.3**	**–37.4**	**–35.7**	**–36.3**

Source: GHG emission data provided by Hungary during the review.

85. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector (not including transport), amounting to projected reductions of 28,858 kt CO_2 eq (51.4 per cent) between 1990 and 2020. The pattern of projected emissions reported for 2030 under the same scenario remains approximately the same. However, the projections also show an increase in transport emissions of 32.1 per cent from 1990 to 2020, owing mostly to an increase in the number of vehicles and the ageing of the vehicle fleet. This trend is expected to continue, reaching an increase of 67.6 per cent compared with the 1990 level by 2030.

86. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by sector and by gas change slightly due to planned PaMs in the energy, transport, LULUCF and waste sectors. The sector showing the greatest emission decrease under the WAM scenario compared with the WEM scenario is the LULUCF sector, which is expected to absorb an additional 853.8 kt CO_2 eq.

87. Hungary presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 12.

Table 12
Summary of greenhouse gas emission projections for Hungary presented by gas

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Gas	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2	73 448	44 933	44 917	47 633	47 441	–38.8	–38.8	–35.1	–35.4
CH_4	11 746	8 025	7 951	7 296	6 955	–31.7	–32.3	–37.9	–40.8
N_2O	8 315	4 530	4 530	4 813	4 813	–45.5	–45.5	–42.1	–42.1
HFCs	NO	1 292	1 292	499	499	NA	NA	NA	NA
PFCs	376	1	1	1	1	–99.7	–99.7	–99.7	–99.7
SF_6	11	116	116	134	134	966.4	966.4	1129.9	1129.9
NF_3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total GHG emissions without LULUCF	**93 896**	**58 898**	**58 808**	**60 375**	**59 842**	**–37.3**	**–37.4**	**–35.7**	**–36.3**

Source: GHG emission data provided by Hungary during the review.

88. For 2020 the most significant reductions are projected for CO_2 emissions (without LULUCF): 28,515 kt CO_2 eq (38.8 per cent) between 1990 and 2020 under the WEM scenario.

89. The projections by gas for 2030 show a slight increase in CO_2 emissions and an expected further decrease in CH_4 emissions.

90. If additional measures are considered (i.e. in the WAM scenario), the patterns of emission reductions by 2020 presented by sector and by gas are similar.

(d) Assessment of adherence to the reporting guidelines

91. The ERT assessed the information reported in the NC7 of Hungary and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 13.

Table 13
Findings on greenhouse gas emission projections reported in the seventh national communication of Hungary

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 28 Issue type: completeness Assessment: encouragement	Hungary did not provide a WOM scenario in its NC7. During the review, Hungary explained that a WOM scenario was not prepared. The ERT encourages the Party to improve the completeness of its reporting by including a WOM scenario in the next NC.
2	Reporting requirement specified in paragraph 28 Issue type: transparency Assessment: recommendation	The ERT noted that there were inconsistencies in the values reported and in some calculations in the projections tables of the NC7 (tables 5.2 and 5.3). For example, the values reported for the IPPU sector in table 5.3 correspond to the agriculture sector. Also, the ERT noted inconsistencies between the values reported for each sector and the total values. Finally, the ERT noted that, for the energy sector, the WAM scenario showed higher emission levels than the WEM scenario. During the review, Hungary provided revised versions of CTF tables 6(a) and 6(c), which addressed all issues detected. In order to increase the transparency of the reporting, the ERT recommends that Hungary ensure consistent reporting of the projections in its next NC.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
3	Reporting requirement specified in paragraph 29 Issue: transparency Assessment: encouragement	The ERT noted that for some sectors the projection scenarios showed inconsistencies when compared with the UNFCCC reporting guidelines on NCs, which require the WEM scenario to reflect "adopted" and "implemented" PaMs, while the WAM scenario should additionally include "planned" PaMs. For the transport sector, different underlying expected effects of PaMs were used for the WEM and WAM scenarios. During the review, Hungary provided additional information on its scenarios and the definitions that were used. In order to increase the transparency of the reporting, the ERT reiterates the encouragement made in the previous review report that Hungary explain which PaMs (implemented, planned, adopted) are included in each projection scenario.
4	Reporting requirement specified in paragraph 35 Issue type: completeness Assessment: encouragement	The ERT noted that Hungary did not report emission projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides. In order to increase the completeness of the reporting, the ERT encourages Hungary to provide this information in its next NC.
5	Reporting requirement specified in paragraph 37 Issue type: transparency Assessment: encouragement	The ERT noted that Hungary, in its NC7, did not transparently report projections together with actual inventory data for the period from 1990 to the latest year available. The ERT also noted that actual inventory data up to 2015 were only included in CTF table 6 as part of the BR3, which was submitted as an annex to the NC7, but no cross reference was provided. To enhance the transparency of the reporting, the ERT encourages Hungary to present its projections in tabular format by sector and by gas together with actual data for the period from 1990 to the latest year available, or provide transparent cross references between the information provided in the NC and the BR.
6	Reporting requirement specified in paragraph 43 Issue type: transparency Assessment: encouragement	The ERT noted that Hungary did not provide transparent information on the models or approaches used for its projections in its NC7. During the review, the Party provided additional information on the models and approaches used; however, the ERT noted that it did not provide sufficient information on the strengths and weaknesses of the models or approaches, and did not explain how the models or approaches used account for any overlap or synergies that may exist between different PaMs. In order to increase the transparency of the reporting, the ERT reiterates the encouragement made in the previous review report that Hungary provide in its next NC and BR references to more detailed information on the aspects indicated in the UNFCCC reporting guidelines on NCs, including the strengths and weaknesses of the models or approaches used and an explanation of how the models or approaches used account for any overlap or synergies that may exist between different PaMs.
7	Reporting requirement specified in paragraph 47 Issue type: transparency Assessment: encouragement	The ERT noted that Hungary did not transparently describe key underlying assumptions or the values of variables such as GDP growth, population growth, tax levels and international fuel prices using table 2 of the UNFCCC reporting guidelines on NCs. The ERT also noted that Hungary did provide in CTF table 5 the values of the variables used. In order to increase the transparency of the reporting, the ERT encourages Hungary to present in its next NC information on the key underlying assumptions and variables used in the projections using table 2 of the UNFCCC reporting guidelines on NCs, and/or transparently report this information in CTF table 5.
8	Reporting requirement specified in paragraph 48	The ERT noted that Hungary did not provide transparent information regarding the factors and activities affecting the emission trends for the waste and LULUCF

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: transparency	sectors, which is needed to enhance understanding of the emission trends for 1990–2020.
	Assessment: recommendation	In order to increase the transparency of the reporting, the ERT recommends that Hungary provide in its next NC relevant information on the factors and activities driving the projections for each sector, which could be provided in tabular format, in order to enhance the transparency of the emission trends reported.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs and on BRs.

2. Assessment of the total effect of policies and measures

(a) Technical assessment of the reported information

92. In the NC7 Hungary did not present the estimated and expected total effect of implemented and adopted PaMs or planned PaMs.

(b) Assessment of adherence to the reporting guidelines

93. The ERT assessed the information reported in the NC7 of Hungary and identified issues relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 14.

Table 14
Findings on the assessment of the total effect of policies and measures from the review of the seventh national communication of Hungary

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Reporting requirement specified in paragraph 39	The ERT noted that in its NC7 Hungary did not provide the estimated and expected total effect of implemented and adopted PaMs or planned PaMs.
	Issue type: completeness	The ERT reiterates the recommendation made in the previous review report that the Party provide in the projections section of its next NC the estimated and expected total effect of implemented and adopted PaMs, in accordance with the 'with measures' definition, compared with a situation without such PaMs, presented in terms of GHG emissions avoided or sequestered, by gas (on a CO_2 eq basis), in 1995 and 2000, and also for 2005, 2010, 2015 and 2020 (not cumulative savings).
	Assessment: recommendation	

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

3. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

(a) Technical assessment of the reported information

94. In the NC7 Hungary provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. The ERT noted that Hungary does not plan to use the market-based mechanisms to meet its Kyoto Protocol target. Regarding the Party's plans for the second commitment period, Hungary elaborated that it is possible that it would use a limited amount of credits generated from projects under Articles 6 and 12 of the Kyoto Protocol (certified emission reductions and emission reduction units) for compliance.

(b) Assessment of adherence to the reporting guidelines

95. The ERT assessed the information reported in the NC7 of Hungary and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

D. Provision of financial and technological support to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

96. Hungary is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, Hungary provided information in its NC7 and BR3 on its provision of support to developing country Parties. The ERT commends Hungary for reporting this information and suggests that it continue to do so in future NCs and BRs.

97. Hungary reported that, as an EU member State together with the other 10 new EU member States, it is committed to contributing to the assistance provided to developing countries in line with EU regulations in order to fulfil the commitment of developed country Parties to jointly mobilize USD 100 billion per year by 2020 from a wide variety of sources, including public and private sources, through bilateral and multilateral channels.

98. In 2017 Hungary disbursed HUF 80 million (about EUR 0.27 million) for the preparation and design of the Balkan Regional Trust Fund. The Fund is to be launched over the course of 2019 and is expected to play a crucial role in mobilizing climate finance, helping the western Balkan countries to implement their nationally determined contributions under the Paris Agreement in the form of bankable projects.

99. Hungary plans to provide climate finance to developing country Parties through multilateral and bilateral channels in the coming years. The Hungarian Government pledged HUF 1 billion (about EUR 3.2 million) for bilateral climate finance at the United Nations Climate Change Conference in Paris, of which about one third (HUF 347 million) has already been disbursed for a sustainable forest plantation in Uganda, and the remaining HUF 653 million will be committed in the course of 2018. An additional HUF 1 billion was transferred to the Green Climate Fund in 2016. The greatest share of Hungarian international climate finance goes to adaptation projects, including projects in northern, eastern and southern Africa, south-eastern Asia and south-eastern Europe.

E. Vulnerability assessment, climate change impacts and adaptation measures

1. Technical assessment of the reported information

100. In the NC7 Hungary provided the required information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the actions taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Hungary provided a description of climate change vulnerability and impacts on human health, water management, forestry, agriculture, urban infrastructure and public safety, and highlighted the adaptation response actions taken and planned at different levels of government.

101. The previous ERT recommended that Hungary provide more information in its NC7 on existing and planned adaptation actions and initiatives, and explain how the actions are to be implemented. It also encouraged Hungary to include information on the latest developments in adaptation planning under the second NCCS in its next NC.

102. In its NC7 Hungary provided updated information, stating that the second NCCS was approved by the Hungarian Government in 2017 and is in 2018 in the process of seeking approval by Parliament. The second NCCS provides a comprehensive framework of climate policy that comprises three main pillars: mitigation, adaptation and awareness-raising. It also outlines the goals (including national commitments) and action lines on climate change, both

sectoral and territorial, towards policy and economic planning and the whole society. It is an umbrella strategy, which has a coordinating role in terms of all the other sectoral strategies. During the review, Hungary provided the latest updated version of the second NCCS and its Climate Change Action Plan 2018–2020, which is a tool for implementing the second NCCS.

103. The ERT commends Hungary for its reporting following the recommendation and encouragement of the previous ERT.

104. The NC7 includes a detailed overview of the future impacts of climate change in Hungary, which were provided by HMS, based on the results of the regional climate models (ALADIN and REMO) with A1B scenarios for the period 2021–2100. A further increase in average temperature of 1 °C is projected across almost the entire country and in every season for 2021–2050. This will even exceed 4 °C in the summer months compared with the reference period of 1961–1990. Studies show that temperature extremities are shifting significantly towards warming: the number of frosty days will decrease and the number of summer and heatwave days will increase. Under these future climate projections, the Party assessed the vulnerability of agriculture, housing and habitation, transportation, waste management, energy infrastructure, tourism and public security. Table 15 summarizes the information on vulnerability and adaptation to climate change presented in the NC7 of Hungary.

105. Although the second NCCS and respective action plans are pending approval by Parliament, several measures have already been implemented to counter the impacts of climate change in Hungary. During the review, Hungary provided additional information on such measures, namely the heat health warning system and ADCS.

106. The heat health warning system is coordinated such that the temperature monitoring data from meteorological units are integrated with information from the national health administrative bodies. Under this system, the chief medical officer is responsible for defining and declaring the heat alert, its starting date and level and, if foreseen, its end. The announcement of heat alert is provided to the district governmental agencies, which send the announcement to the leaders of health-care institutions acting in the area of their competency. A high daily mean temperature implies a level of risk for the population, which requires the public to be informed and the health care system to be warned in order to launch preventive measures.

107. ADCS has been in operation since 2012. It aims to compensate farmers for damage to plant growth; namely, for a yield loss exceeding 30 per cent caused by adverse climatic events including drought, inland inundation, flood, frost in winter, frost in spring, frost in autumn, rainstorm, storm and hail. Farmers participating in the system pay a yearly damage mitigation contribution. The State contributes to the fund with the same amount (budgetary support). The scheme is continuously developed and tuned in response to needs and changing climate conditions.

Table 15
Summary of information on vulnerability and adaptation to climate change reported by Hungary

Vulnerable area	*Examples/comments/adaptation measures reported*
Human health	*Vulnerability*: temperature waves causing heart and respiratory problems in urbanized areas; appearance of new pests and diseases
	Adaptation: preventive measures; health-care development; formation of air-conditioned shelters; vaccination and improved research and development in the field; heatwave monitoring and alert system
Water management	*Vulnerability*: droughts threatening freshwater supply; floods threatening water defense lines and human settlements
	Adaptation: infrastructural developments; improved water management practices; utilization of rainwater for irrigation
Forestry	*Vulnerability*: droughts impairing forest development; extreme weather events causing tree loss; new diseases and pests
	Adaptation: new drought-resistant species; improved forest management practices

Vulnerable area	*Examples comments adaptation measures reported*
	and research and development in the field
Agriculture	*Vulnerability*: droughts causing irrigation problems, thus hindering agricultural production; floods and inundations causing inland water
	Adaptation: ADCS implemented to compensate for damage caused by drought, inland water, hail, agricultural flooding, frost damage to plantations, upland crops and vegetables; organic agriculture on wetlands; improved defences; improved irrigation and water use
Urban infrastructure	*Vulnerability*: heatwaves causing heat islands
	Adaptation: urban area development; afforestation, where possible, increasing green cover; better engineering practices
Public safety	*Vulnerability*: migration; weather-related catastrophes (floods, storms, blizzards)
	Adaptation: improved civil defences; improved institutional background; preparation measures; preventive measures

2. Assessment of adherence to the reporting guidelines

108. The ERT assessed the information reported in the NC7 of Hungary and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

F. Research and systematic observation

1. Technical assessment of the reported information

109. Hungary provided information on its general policy and funding relating to research and systematic observation, both domestic and international activities, including contributions to the Global Climate Observing System and the IPCC. During the review, Hungary also provided information on the identification of opportunities for and barriers to free and open international exchange of data and information and on action taken to overcome such barriers.

110. Hungary has implemented international and domestic policies and programmes on climate change research, systematic observation and climate modelling that aim to advance capabilities to predict and observe the physical, chemical, biological and human components of the Earth's system over space and time. Funding for climate change research mainly stems from EU sources and the National Research, Development and Innovation Fund. The ERT noted that Hungary's research efforts are coordinated and supported through the active participation of the Hungarian Academy of Sciences, HMS, and national universities and research institutions.

111. The outputs from the National Adaptation Geo-information System research project (2013–2016) carried out by the Mining and Geological Survey of Hungary provided valuable information needed to support the implementation, supervision and evaluation of the second NCCS, the implementation and evaluation of the Environment and Energy Efficiency Operational Programme, and local and regional strategic planning. The project has been further developed in a second phase with the aim of elaborating a decision-support toolbox to underpin policy and municipal adaptation measures on the basis of the development of the databases, methodologies and evaluation modules. The expected results will support the substantiation of climate policy and sectoral planning; the elaboration of policy decision-support studies; the strategic planning of settlement and regional municipal climate protection; and the provision of a professional foundation for setting adaptation goals. In addition, the results may contribute to the dissemination of knowledge on climate adaptation and raising climate awareness.

112. In terms of activities related to systematic observation, Hungary reported on national plans, programmes and support for ground- and space-based climate observing systems, including satellite and non-satellite climate observation. Observation activities are mainly carried out or coordinated by HMS and the Department of Meteorology at Eötvös Loránd

University. HMS has coordinated with the Global Telecommunication System of the World Meteorological Organization and with various international organizations, including the European Commission, on background GHG concentrations and air quality monitoring. Hungary has continued to provide data to the Global Atmosphere Watch programme since the 1990s.

113. The NC7 reflects actions taken to support capacity-building and the establishment and maintenance of observation systems and related data and monitoring systems, including in developing countries. Six Turkish experts visited HMS in 2015 to study the methods used by Hungary to measure air quality. HMS shared experience relating to its observation network and visualization of its forecasting products with developing countries taking part in the "ICT technologies and observational requirements for SEE-MHEWSA" project. Within the framework of the bilateral agreement between HMS and the Ukrainian Hydrometeorological Center, HMS shares experience regarding air pollution measurements, meteorology and forecasting services.

2. Assessment of adherence to the reporting guidelines

114. The ERT assessed the information reported in the NC7 of Hungary and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

G. Education, training and public awareness

1. Technical assessment of the reported information

115. In the NC7 Hungary provided information on its actions relating to education, training and public awareness. The Party provided information, from its second NCCS and action plans, on the general policy on education, training and public awareness, primary, secondary and higher education, public information campaigns, training programmes, education materials, resource or information centres, the involvement of the public and non-governmental organizations and its participation in international activities.

116. The NC7 includes a list of courses related to climate change offered at Hungarian universities and colleges, as well as training activities, both centralized and decentralized, mostly geared towards professionals in the fields of construction and engineering. The NC7 also contains information on activities undertaken by various organizations to raise awareness of climate change. This includes EU initiatives and those undertaken by organizations ranging from churches and national civil organizations to local chapters of international non-governmental organizations.

2. Assessment of adherence to the reporting guidelines

117. The ERT assessed the information reported in the NC7 of Hungary and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

III. Conclusions and recommendations

118. The ERT conducted a technical review of the information reported in the NC7 of Hungary in accordance with the UNFCCC reporting guidelines on NCs. The ERT concludes that the reported information mostly adheres to the UNFCCC reporting guidelines on NCs and that the NC7 provides an overview of the national climate policy of Hungary.

119. The information provided in the NC7 includes most of the elements of the supplementary information under Article 7 of the Kyoto Protocol, with the exception of information on PaMs in accordance with Article 2 of the Kyoto Protocol. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of

adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol was provided by Hungary in its 2017 annual submission.

120. Hungary's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 34.9 per cent below its 1990 level, whereas total GHG emissions including LULUCF were 40.1 per cent below its 1990 level, in 2015. Emission decreases were driven mainly by the economic downturn in the country due to its transition to a market economy, mainly during the period 1985–1995, which was followed by a decade of economic growth characterized by an increase in GDP without a corresponding increase in GHG emissions.

121. Hungary's main policy framework relating to energy and climate change is its second NCCS and its National Energy Strategy. Key recent legislation supporting Hungary's climate change goals includes the acts on the publication of the Doha Amendment and the Paris Agreement and the 2007 Climate Change Act. The mitigation actions with the most significant impact are the replacement and increase in the capacity of the Paks nuclear power plant, increasing the share of renewable energy sources in the electricity and heating and cooling sectors, energy efficiency improvements achieved via the National Energy Efficiency Action Plan and the promotion of alternative fuels and electricity in the transport sector.

122. The GHG emission projections provided by Hungary include those under the WEM and WAM scenarios. In the two scenarios, emissions are projected to be 37.3 and 37.4 per cent below the 1990 level in 2020, respectively. On the basis of the reported information, the ERT concludes that Hungary will contribute to achieving the EU 2020 target under the WEM and WAM scenarios, and that Hungary expects to meet its target for non-ETS sectors as the projected level of emissions under the WEM and WAM scenarios is 25.9 and 26.1 per cent, respectively, below the AEA for 2020.

123. The projections indicate that Hungary is on track to meet its Kyoto Protocol target for the second commitment period (20 per cent reduction compared with the 1990 level by 2020), and that GHG emissions are not expected to exceed the Kyoto Protocol target even by 2020. The ERT noted that, on the basis of the reported information and the results of the projections for 2020 under the WEM and WAM scenarios, Hungary is making progress towards its emission reduction target under the Convention and may achieve or overachieve its emission reduction target by 2020.

124. Hungary is not planning to make use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol target.

125. Hungary is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, Hungary provided information on its provision of support to developing country Parties through multilateral and bilateral channels, which focuses on supporting adaptation actions and sustainable forestry activities in developing countries.

126. In the NC7 Hungary provided the required information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement the policies. Several measures have already been implemented to counter the impacts of climate change in Hungary, such as the heat health warning system and ADCS. The adaptation policies are described in the second NCCS, approved by the Hungarian Government in 2017 and awaiting approval by Parliament in 2018. Information on the Climate Change Action Plan 2018–2020 as a tool for implementing the second NCCS was provided during the review.

127. Research and systematic observation by Hungary has contributed information and data to both domestic and international activities, including contributions to the Global Climate Observing System and the IPCC. Funding for climate change research in Hungary mainly stems from EU sources and the National Research, Development and Innovation Fund. The research outputs (e.g. of the National Adaptation Geo-information System project) have provided valuable information needed to support the implementation, supervision and evaluation of the second NCCS and other national, regional and local planning and implementation of adaptation measures. Currently, the second phase of the aforementioned

project is being developed and it is expected to further support adaptation, the dissemination of knowledge and awareness-raising in Hungary through various technical tool and database developments. The ERT noted that Hungary's research efforts are well coordinated and supported through the active participation of the Hungarian Academy of Sciences, HMS, and national universities and research institutions.

128. In the NC7 Hungary provided information on its actions relating to education, training and public awareness. Generally, climate change issues are integrated into education programmes at all levels of education. Awareness-raising is one of the three pillars of the second NCCS. Awareness-raising activities are undertaken by organizations ranging from churches and national civil organizations to local chapters of international non-governmental organizations.

129. In the course of the review, the ERT formulated the following recommendations for Hungary to improve its adherence to the UNFCCC reporting guidelines on NCs and its reporting of supplementary information under the Kyoto Protocol:[4]

(a) To improve the completeness of its reporting by:

(i) Communicating information on PaMs in the industrial processes sector adopted to implement commitments under Article 4, paragraph 2(a) and (b), of the Kyoto Protocol (see table 9, issue 2);

(ii) Providing information on the steps taken to promote and/or implement any decisions by ICAO and IMO to limit or reduce emissions of GHGs not controlled by the Montreal Protocol from aviation and marine bunker fuels (see table 9, issue 6);

(iii) Providing the estimated and expected total effect of implemented and adopted PaMs, in accordance with the 'with measures' definition, compared with a situation without such PaMs, presented in terms of GHG emissions avoided or sequestered, by gas (on a CO_2 eq basis), in 1995 and 2000, and also for 2005, 2010, 2015 and 2020 (not cumulative savings);

(b) To improve the transparency of its reporting by:

(i) Ensuring that the reporting of GHG emissions is consistent throughout the NC (see table 6, issue 1);

(ii) Providing more detailed information on how its national registry performs the functions and includes the elements listed in paragraph 32(e) and (j) of the UNFCCC reporting guidelines on NCs, which may be provided in tabular format (see table 7, issue 1);

(iii) Integrating the information provided in the chapter on national circumstances into the chapter on PaMs in order to provide a complete and transparent overview of all PaMs (see table 9, issue 1);

(iv) Organizing the reporting of PaMs by sector in its next NC (see table 9, issue 3);

(v) Providing more detailed information on how it strives to implement PaMs in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties, which may be provided in a dedicated section (see table 9, issue 7);

(vi) Ensuring consistent reporting of the information on projections (see table 13, issue 2);

(vii) Providing more detailed information on the factors and activities driving projections for each sector, which could be provided in tabular format, in order to enhance the transparency of the emission trends (see table 13, issue 8);

[4] The recommendations are given in full in the relevant sections of this report.

(c) To improve the timeliness of its reporting by submitting its next NC on time (see para. 6 above).

IV. Questions of implementation

130. During the review the ERT assessed the NC7, including the supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, and reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol with regard to timeliness, completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. No questions of implementation were raised by the ERT during the review.

Annex

Documents and information used during the review

A. Reference documents

2017 GHG inventory submission of Hungary. Available at http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php.

BR3 of Hungary. Available at http://unfccc.int/national_reports/biennial_reports_and_iar/biennial_reports_data_interface/items/10132.php.

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EEA. 2017. *Trends and projections in Europe 2017. Tracking progress towards Europe's climate and energy targets*. Available at www.eea.europa.eu/publications/trends-and-projections-in-europe-2017.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories". Annex to decision 24/CP.19. Available at http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf.

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"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Annex to decision 15/CMP.1. Available at http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf.

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Report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of Hungary. FCCC/IRR/2016/HUN. Available at http://unfccc.int/documentation/documents/advanced_search/items/6911.php?priref=600009495.

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http://unfccc.int/documentation/documents/advanced_search/items/6911.php?priref=600009062.

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Revisions to the guidelines for review under Article 8 of the Kyoto Protocol. Annex I to decision 4/CMP.11. Available at http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf.

"UNFCCC biennial reporting guidelines for developed country Parties". Annex I to decision 2/CP.17. Available at http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Barbara Botos (Hungarian Ministry of National Development), including additional material. The following documents[1] were provided by Hungary:

Ministry of National Development. 2017. *Climate Change Action Plan – Executive Summary*.

Ministry of National Development. 2018. *Climate Change Strategy for the period between 2017 and 2030*. Available at web address. http://nakfo.mbfsz.gov.hu/en/node/365.

[1] Reproduced as received from the Party.